

His cells have a good sized nucleus with a considerable amount of protoplasm around them, and numerous fine processes with one or two large ones which do not taper off to fine points, and resemble very much the large one figured by us, as seen in the posterior part of the lateral column in the cervical region.

Explanation of Figures.—Figures 1 to 11. Sections from various regions of both spinal cords, showing the various distribution of the sclerosed patches. Verick No. 2. Eye piece 3.

Fig. 12. A neuroglia cell in the white matter of the spinal cord; increase in the size of the nucleus, with an enormous increase of the protoplasm around it. 1st stage.

Fig. 13. From a section through the corpus striatum; a large number of branching cells are seen distributed in a somewhat coarse mesh of neuroglia fibres; one or two cells proper to the corpus striatum undergoing degeneration. 2d stage.

Fig. 14. Section from the brain; axis cylinders without a trace of myeline, lying in a very coarse, loosely arranged neuroglia fibre; a few branching cells showing all stages of degeneration. 3d stage.

Fig. 15. Showing transverse section of artery with hypertrophied muscular coat, and an increase of nuclei in all the coats.

Fig. 16. A very large branching neuroglia cell seen in the white matter of the cord; two nuclei are to be seen, one of which shows a constriction in the middle as if it were about to divide. Verick No. 7. Eye piece No. 3.

ART. VI.—CONTRIBUTION TO THE STUDY OF OSSIFICATION OF THE MENINGES.

BY J. N. DE HART, M. D.,

SECOND ASSISTANT PHYSICIAN TO THE HOSPITAL FOR INSANE,
MENDOTA, WIS.

CALCAREOUS plates situated on the cerebral membranes are frequently found in epileptics, and in lepto-meningitis of long standing as well as in pachy-meningitis. True ossification is rather rare, and it usually begins on the inner surface of the cranial bones, and presents itself in the shape of spiculæ of bone. In calcareous plates bone corpuscles are never found; in spiculæ and bony tumors they are always present.

The former owe their origin merely to a deposit of calcareous salts in exudative inflammatory products: the latter are the result of a true organizing action, through the medium of cells, exactly as in normal bone. Ossification in the membranes of the brain is of very rare occurrence, but calcareous degeneration of their exudation laminæ sometimes takes place, as it is known to occur even in ganglionic cells of the brain.

Erlenmeyer found the commissure of the optic nerves hardened, by deposits of calcareous matter in the brain of a monomaniac, who had died with epileptiform convulsions. It had been first deposited about the small arteries, and the connective tissue; the cells had afterward been occupied and made opaque by fine granules, of what appeared to be phosphate of lime.

Forster in his atlas of Pathological Anatomy, describes calcified cells found in the gray substance of the lumbar enlargement of the spinal cord, of a boy whose lower extremities were paralyzed.

Heschl, in *Schmidt's Jahrbuecher*, 1863, is the only one, so far as I am able to find, who met with what he calls an ossification of cells in the brain of a patient, æt. 26 years, who died melancholic: they were in the compact substance surrounding a small hemorrhagic cavity in the cortical part of the right cerebral hemisphere. He used hydrochloric acid to dissolve the granular contents, and this left the cells with a pale outline in view.

The following case is one in which, on making an autopsy, there were found to exist several genuine ossifications of the falx cerebri.

T. S. L., was admitted to the State Hospital for Insane July 1, 1876, æt. 35 years. Born in England, married, tailor. The certificate states that this attack, which is the first, commenced three months since. He was formerly very intemperate, but has not drank much for the last three months. The disease is increasing. He fears that he is going to be taken away by some person unknown. Is not suicidal nor homicidal. Is neither destructive of clothing nor of filthy habits. Physical health very much enfeebled. He was rather passionate and smoked to excess. Has had one stroke of paralysis (but could

not ascertain whether it was paraplegia or hemiplegia). No relatives have been insane. Venereal excess is supposed to be the predisposing cause of this attack. On the morning of the 12th of July, he was unable to rise from the bed. His pulse was beating rapidly at the rate of 105 per minute, and the temperature of his body was 107°. The bladder was distended with urine and a catheter was introduced: about three quarts of bloody urine was withdrawn. The next day the scrotum was swollen, and urine discolored with blood was continually dribbling from the bladder. A catheter was again introduced and he was relieved of one quart of urine. His appetite was very fair, pulse and temperature nearly normal.

On the 14th the inflammation of the scrotum had somewhat abated. Although he continued to take considerable nourishment, yet he failed rapidly; he soon became comatose, and after remaining in this condition for several hours, died at 5 P. M.

This patient being in such an enfeebled condition at the time of his admission, and never rallying, it was impossible to obtain any facts concerning his previous history except as stated in his application.

An autopsy was made 22 hours after death, with the following results: The cadaveric rigidity was well marked. The lungs, spleen, and kidneys were normal. The heart was hypertrophied and fatty. The bladder was greatly enlarged, and its walls thickened; the mucous membrane, and in some places the muscular tissue, was ulcerated. It was very evident that the patient had suffered for a long time from chronic cystitis, with ulceration as a result. The scalp was normal. The calvarium moderately thick. The falx cerebri was found to be partly ossified; the ossified portion measured two inches in length and three-fourths of an inch at its widest point; some spiculæ were detached from this portion. The brain otherwise was in a normal condition, as far as the naked eye could determine.

In preparing these spiculæ for microscopic examination, I selected the chromic acid solution (2 gr. to 1 oz. of water) in preference to using hydrochloric (dilute) acid. The decalcification takes place slowly, according to the strength of the solution, and this should be changed every few days as the

acid dissolves the lime more rapidly when this is frequently renewed.

On microscopic examination these spiculæ were found to be true bone. Some sections of the ossified portion were placed in a similar solution for a few days: sections were then made, and stained with carmine in glycerine. They were then mounted in glycerine and submitted to an examination, which revealed the presence of the laminæ, Haversian canals and lacunæ of true bone.

Beginning as these growths do from that membrane which acts the part of a periosteum for the internal surface of the cranium, we are inclined to attribute the production of genuine bony plates in the dura (as well as its falciform processes) to a relapse in the direction of its previous formative activity in infantile life.

A connecting link between this osseous heterotopia and the normal production of bone is furnished by those triangular portions of bone occasionally found by the side or to the side of, and below the posterior clinoid processes, in the tentorium cerebelli. Histologically they do not differ from the hyperplastic spiculæ just described. Morphologically, however, they constitute an analogue of the *bony* tentorium of the lower mammalia and are more frequent in the negro than the Caucasian, although even in the latter, not infrequent, as shown by the older anatomists.
